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United States Department of Agriculture, DIVISION OF BOTANY.

THE SECTION OF SEED AND PLANT INTRODUCTION.

The general purposes and methods of systematic plant introduction have already been set forth, with numerous facts and examples, in a bulletin* of the Division of Forestry, written by Mr. D. G. Fairchild. The recent administrative transfer of this Section to the Division of Botany, together with a change in the personnel of the office, renders it desirable, however, that this general statement be supplemented by some details of the plans under which the work of plant introduction is to be continued.

Of the thousands of species enumerated in books as being of use in different parts of the world, relatively few can be expected to find permanent places in our domestic economy. Indeed, we have more or less completely abandoned the use of many food plants valued by our ancestors and still extensively employed by more backward peoples, having thrown them aside for other products more palatable and more nutritious.

It is not desirable, then, that all useful plants not now known in America should be introduced; on the contrary the work of plant introduction is a process of careful and judicious selection. The public would soon weary in testing the miscellaneous novelties which might be assembled by thousands from all parts of the earth. There are, however, hundreds of more or less meritorious plants which should have a trial at the bar of public taste, and of the plant species already well known to us there are hundreds of varieties which will probably prove superior in quality and profit to those now grown in one part or another of our vast agricultural domain.

As pointed out by Mr. Fairchild, American agriculture is almost entirely concerned with introduced plants, so that the present formal recognition of the work of plant introduction may be looked upon as the result of a desire on the part of the governmental authorities to pursue in a thorough, systematic, and economical manner a work which has been in desultory progress since the time of Columbus.

It is accordingly proposed to make a canvass of the useful plants of all countries with the purpose of securing and introducing to the United States such of them as give promise of utility in our advancing civilization. Our interests forbid that we should purchase abroad any product which can be successfully grown here, or that our agricultural industries should anywhere fail of their fullest remuneration through the cultivation of inferior varieties of economic plants. To supply these deficiencies as rapidly as possible, but with such careful discrimination as shall avoid the disappointment and waste resulting from false hopes and ill-advised projects is the difficult and important task devolving upon the Section of Seed and Plant Introduction.

* U. S. Department of Agriculture, Division of Forestry, Bulletin 21, 1898.

ANALYSIS OF PROBLEMS.

In formulating plans for the work of plant introduction it has seemed that four somewhat distinct problems are involved. Although these are closely related in theory, they may, from the practical standpoint, be best approached as separate tasks, as shown in detail below.

I. The introduction of new and superior varieties of plants belonging to species already in cultivation in the United States.

This is the first and simplest of the four cases, since it will be comparatively easy to learn of such varieties, their value will be readily appreciated, their culture will seldom offer new difficulties, and a market already exists.

Introductions of this character should be comparatively extensive, so that the public may have, at the earliest possible date, the advantage of improved crops. The only danger is that, unless the claims of new varieties receive careful preliminary investigation, public interest and confidence may be alienated by the distribution of seeds and plants of less value than those for sale by the regular trade. There is, furthermore, no necessity for the importation of any plant for which there is an established demand which may now be filled through commercial channels.

II. The introduction to cultivation in the United States of plants, the products of which are now imported from abroad.

Methods of cultivation being, in this instance, more or less unknown, must in many cases be carefully investigated, both in the present seat of production and also by experimentation under American conditions, in order that there be no waste or disappointment through ignorance or avoidable mistakes on the part of the farmer. The possibility of the successful cultivation of a new crop in the United States having been demonstrated, the Department must be ready to distribute with the seeds or plants adequate and practical directions for planting, cultivating, and marketing. The incipient industry should remain for some time under observation and, if necessary, the attention of dealers should be called to the home product.

III. The introduction of plants now neither cultivated nor used in the United States.

This is the most complex and difficult of the four problems. It is necessary in carrying out this part of the work:

1. To determine that the plant has qualities likely to make it valuable in some part of the United States.
2. To ascertain whether cultivation in the United States is likely to prove practicable and profitable to such an extent as to warrant an attempt at general introduction.
3. To distribute seeds and plants with the information necessary to insure proper care in cultivating and marketing.
4. To create a market by extensive and sustained dissemination of knowledge regarding the desirable qualities of the new product.

IV. The introduction of species and varieties of which the present utility can not be confidently expected, but which it is desired to acclimatize, improve by selection, use for grafting-stocks, or most important of all, employ in the production of hybrids.

It is manifestly of the utmost importance for such purposes that the plants remain for long periods accessible to the observation and subject to the experimentation of specialists. Distribution will accordingly be limited almost entirely to those able and desirous of utilizing plants in actual investigation.

ORGANIZATION.

Among the necessary adjuncts of the work of plant introduction may be enumerated the following:

I. A corps of trained agricultural explorers and plant introducers, occasionally supplemented by experts in particular industries.

Two agricultural explorers are now in the field. Mr. Walter T. Swingle has for several months past been investigating several of the agricultural industries of Germany and France, and is about to continue this work in Italy and Algeria. Mr. David G. Fairchild, until recently special agent in charge of this office, has set out for Central and South America in the company of the Hon. Barbour Lathrop, of Chicago, honorary representative of this Department. Two specialists in cereals have also been abroad during the past summer and are now on their way to this country with the seed secured by them. Dr. Seaman A. Knapp has investigated rice culture in Japan and secured a quantity of superior seed for trial in the Southern States. Mr. Mark A. Carleton, of the Division of Vegetable Physiology and Pathology, has visited Russia in order to secure, if possible, varieties of wheat resistant to cold, drought, and rust.

In addition to the results secured through direct exploration and investigation, much incidental assistance is expected from Americans abroad, consular officers, merchants, missionaries, and travelers. The cooperation of many such has already been secured, but it is expected that the circle will be greatly widened through correspondence and publications. It is certainly a work of patriotism as well as of humanity to assist in creating new industries and in extending as widely as possible the use of the fruits of the earth. From the various botanical and experimental gardens and the agricultural departments of foreign governments accessions of new plants are also expected in exchange for what this office may be able to furnish.

II. Experimental farms and grounds in different parts of the country, for receiving, testing, inspecting, quarantining and, when necessary, propagating newly imported plants.

The facilities of the Department of Agriculture and the State experiment stations go far toward supplying this demand, and these means are supplemented in an important manner by numerous private experimenters in all parts of the country. The experiment stations of the various States have been organized and maintained for the purpose of furnishing agricultural knowledge of local value. With such a force of practical investigators in the field it might seem that the responsibilities of an office of plant introduction would end with the distribution of seeds or cuttings to the experiment stations. But for a variety of reasons this is not the case. Not all such institutions are adequately equipped for giving a practical and final decision upon the merits of a new plant. Strictly speaking, only the explorer who has seen it growing in its foreign home can tell whether the attempt at cultivation here has been really successful. In the work of plant introduction it is accordingly necessary that cognizance be taken of outside experiments in the growth of all novelties, to the extent of making certain that adequate and satisfactory tests are being carried on. Otherwise the labor and expense of importation must be repeated indefinitely. A man or an experiment station which can not make a plant grow is certainly in no position to pronounce an adverse decision upon its value. It may be accepted in general that any plant cultivated abroad can, with proper care and facilities, be cultivated somewhere within the recently extended boundaries of the United States. Whether it is worth cultivating is another question which must be adequately answered before the experiment is complete. The product may be of sufficient value to justify the expenditure of a large amount of effort; yet too often the new

candidate for attention gets even less care than the established crops, and is put aside with the expectation that it will loudly assert its own merits, if it has any.

Many experiments must be continued for considerable periods, and there will doubtless be frequent instances where it will not be possible to be assured in advance of this necessary special attention to a particular plant, which may not fall within the declared specialties of the various stations and private growers. Especially will it be desirable in cases where only a small amount of seed or few cuttings can be secured, to postpone distribution, even to the experiment stations, until a sufficient amount of material has been propagated to obviate the danger of the complete loss of valuable importations.

Inseparable from the work of plant introduction is, moreover, the danger of the unintentional importation of seeds, plant diseases, and insect pests, now recognized as capable of inflicting grave injuries upon agriculture. Such calamities can be avoided only by a most thorough system of inspection and disinfection, and, whenever possible, by quarantine for a considerable period. Unless the antecedents of the plant are fully known it is not safe to make importations except in quantities so small as to permit the fullest observation and control, the seed for general distribution being preferably raised in this country from stock found to be pure and uninfected by pests and parasites. Indeed, it would probably be wiser, and would certainly be safer, to employ this method exclusively, since weeds or parasites which are considered harmless or insignificant in their original homes have often been found extremely injurious when removed to new regions where their natural enemies or climatic checks do not exist.

III. Libraries, collections, and catalogues for the accumulation of information regarding useful plants which are available for introduction or have been introduced.

Under this head the following details are worthy of special mention.

1. The accumulation of knowledge concerning the useful plants of all countries. This information is to be drawn from general and technical literature, books of travel, investigations of special problems, and from the field notes and reports of the agricultural explorers of the Section.

In this work a reference collection of the species and varieties of cultivated plants together with their seeds and fruits is a necessity. This need is partially supplied by the seed collection of the Division of Botany and it is expected that the other departments of an economic collection will be begun at an early date.

For the use of agricultural explorers in the field a system of notes has been devised which can be arranged geographically as well as by subjects. This has been found already to be of great utility. By means of it a large quantity of memoranda drawn from the greatest variety of sources can be concentrated at a single point. It is expected that thus equipped an agricultural explorer will be able to approach his work at great advantage and accomplish in a single season what the desultory and uninformed traveler would take years to learn.

2. The careful recording and, when necessary, the making of investigations bearing upon the question whether the more or less general cultivation of particular plants is possible in the United States. There have been large numbers of desultory importations the success of which is still in doubt. These cases need to be studied. In some of them failure is probably traceable to the planting of poor varieties or to lack of knowledge of methods of cultivation. Even where the causes of failure are not removable, the facts should be published in order that there be no further waste of effort.

IV. An office equipped for conducting the importation and distribution of seeds and plants, and for preparing the publications necessary for the general dissemination of knowledge concerning new plants of demonstrated utility in the United States.

In the receipt and distribution of large numbers of packages of seeds, the greatest care must be taken to avoid mistakes and substitutions. In this office all shipments are carefully inspected on arrival, numbers and labels are checked and counterchecked, and a reference series is deposited with the seed collection of the Division of Botany, so that any possible error may at any time be traced and rectified.

Careful and easily accessible records are kept by which the history of all seeds distributed from this office may be traced; all correspondents receiving seeds for trial do so under an agreement to report the result of the test. With these reports as a basis, the merits of the various importations are to be carefully investigated, in order to determine whether the plant has succeeded or gives promise sufficient to justify further trial.

Publications of various sorts will need to be issued in the prosecution of this work. Among these may be mentioned reports from agricultural explorers, accounts of particular industries of foreign countries, information for American growers, directions for the use of new products, and statements of the progress, success, or failure of the various introductions.

To repeat, then, the problems of plant introduction center about four simple questions: Does the plant give promise of being of use in the United States? Is it safe to import it? What treatment is necessary to induce it to grow? Is the product sufficiently desirable to justify the effort? Individuals and stations might be deluged for a few years with all sorts of novelties, few, if any, of which would have their merits properly investigated. It is only by a careful and systematic application of the above questions to each of the economic plants of the world, in the order of their apparent merit or promise, that a serious and effective effort at the improvement of American agriculture by plant introduction can be sustained.

PUBLIC COOPERATION SOLICITED.

The superior intelligence and enlightened interest of the American agricultural public will make the introduction of new crops and industries much more rapid and effective than would be the case in any other country. The best informed, most widely known, and best equipped specialists in the culture of particular plants are often private individuals or firms, many of whom are willing to experiment with and report upon any plant in the line of their specialties.

In the case of plants now unknown to our farmers and planters a considerable amount of preliminary investigation may often prove necessary before the trouble and expense of the wider distribution of seeds or cuttings will be justified; but in testing supposedly superior foreign varieties of species already well known to us the widest experimentation among practical farmers is desirable, on account of the immense diversity of soils and climatic conditions which are to be met with even in regions devoted to the same crop, since it is otherwise impossible to determine finally the value of the new variety. If this work were to depend entirely upon direct governmental action the machinery necessary would require far larger appropriations than are available, and much time would be lost before such tests could be carried out, but if the interest of a sufficient number of private experimenters can be enlisted our task will be greatly simplified.

There is, indeed, no lack of those who are willing to plant new seeds, but a warning is necessary, to the effect that to be of real value this class of work must be looked upon as purely experimental and should be undertaken only by those

who have an interest in the study of crops, as well as a practical knowledge of at least the locally cultivated varieties. This office is interested in knowing that an actual experiment will be undertaken, that the results from the imported seeds will be brought into comparison with those obtained from other varieties grown under similar conditions, and that an honest and intelligible report will be made. Only second in importance to a report of the superiority of a new variety is the establishment of the fact of its inferiority, especially if the reasons for this can be definitely stated. It is only by thorough, conclusive, and systematically recorded experiments that the necessity of reimportation can be avoided.

It is scarcely necessary to state that the seed of any novelty of promise should be carefully saved, as the stock obtainable by importation is often very small. Indeed, it is desirable, even in cases of apparent failure, that the seed be gathered and a second attempt made, since many crops are known not to show their true character during the first season under new conditions. Moreover, imported seed may not infrequently be weakened by age, by unfavorable conditions in transit, or by the treatment necessary in disinfecting against insect pests and fungous parasites. As soon as the success of any imported species or variety is assured it will be the policy of this Department to secure for wider distribution a larger quantity of vigorous, clean, and reliably selected seed, either through arrangements with experiment stations or by contract with private parties.

Before being sent out all seeds are carefully inspected for impurities, but it is nevertheless important that new importations be distributed only to agriculturists of sufficient knowledge and experience to recognize any new weeds, send specimens to this office, and absolutely destroy the remainder.

The purpose of the present circular is, accordingly, to aid in supplementing the experimental work of this Department and of the various State experiment stations by enlisting the interest of a limited number of the more intelligent and practical agriculturists of each State, and correspondents who receive this circular are respectfully invited to communicate to this office the names and addresses of those able and willing to participate in the work outlined above, together with a statement in each case of the crop or crops in which such persons are especially interested.

O. F. COOK,
Special Agent

In Charge of Seed and Plant Introduction.

Approved:

JAMES WILSON,
Secretary.

WASHINGTON, D. C., January 25, 1899.





